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ENVIRONMENT VIEWS

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Water Literacy

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Environment Views is published quarterly by Alberta Environment. Each issue deals with a specific topic from various viewpoints with the aim of increasing awareness of environmental issues among Albertans. *Environment Views* is directed by an independent board with representation from environmental groups, government and industry. The views expressed by the publication are not necessarily those of Alberta Environment.

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Letters to the editor are welcomed, and should be sent to the editor,
Environment Views
Alberta Environment Communications Branch
Main floor, Oxbridge Place 9820 - 106 Street
Edmonton, Alberta T5K 2J6

Editor: Maryhelen Vicars
Researcher: Lynn Zwicky
Editorial Board: Jim Dau, director of communications, Alberta Environment; Dave Dodge, Canadian Parks and Wilderness Society; Norman Elliott, public affairs director, Canadian Petroleum Association, Calgary; David McCoy, environmental scientist, Canterra Energy Ltd., Calgary; Hugh Phillips, executive director S.E.E.D.S. Foundation; Kim Sanderson, Canadian Society of Environmental Biologists; David Spink, head of the municipal engineering branch, standards and approvals division, Alberta Environment; Ron Tatasciore, EDA Collaborative Inc., Landscape Architects; and Bob Westbury, assistant vice-president, TransAlta Utilities Corp., Edmonton.

The editorial board was helped in preparing this issue by Dan Stoker, Water Literacy project co-ordinator, Jim Martin, environmental education co-ordinator, Alberta Environment, and Murray Ellis and John Simpson of the Water Literacy project's technical advisory committee.

Alberta
ENVIRONMENT

EDITOR'S NOTEBOOK

Water Literacy Key to Hope

Water literacy — what does that mean? At first glance, the heart sinks — another pretentious term coined by the education profession to replace a perfectly good bit of plain English. You know the kind: language arts has replaced reading and writing; elementary grades tackle number facts instead of arithmetic.

But on second glance, I think water literacy is a wonderfully apt term. Like literacy in English or French, it implies an understanding of the principles of water, its importance, its subtleties and its possibilities.

While the Water Literacy project itself is fascinating, it was our intention with this issue of *Environment Views* to use it as an illustration of a successful approach to environmental education in general. As board members Norm Elliott and David MacCoy point out in their Viewpoint, helping students learn more about the environment is crucial. If there is any hope of society making the sacrifices necessary to stave off the "silent spring", it lies in an informed, committed population.

The beauty of the Water Literacy project (and of other successful environmental education projects) is its simplicity. Certainly science students in senior grades can tackle the complex physics and chemistry of aquatic ecosystems, but it works at much less sophisticated levels, too. A lake in a bottle teaches the interdependence of the organisms in a closed system; from this it is only a short leap to an understanding of the interdependence of all the earth's organisms.

You should receive this on the eve of Environment Week. There are activities all over the province (see Environment Update on page 20 for some ideas). Fundamentally, of course, Environment Week is an environmental education project like Water Literacy and shares the same goals: sharing information and, especially, raising awareness of the value of conservation.

The editor of Environment Views, *Maryhelen Vicars, is a freelance writer and editor based in Edmonton.*

AROUND THE PROVINCE a review by John Dodd

Dry winter means trouble

The driest winter in Alberta since 1889 has threatened crop germination in some areas, raised forest fire hazards and lowered water levels in many farmers' dugouts and even a few municipal reservoirs.

Snowfall across the province last winter was generally less than 50 per cent of normal. And precipitation levels last fall were below normal in seven of the 15 crop regions in the province, according to Keir Packer, a crop statistician for Alberta Agriculture. These two factors left the soil abnormally dry across the province, except in the foothills and a few other areas.

Peter Dzikowski, weather resource specialist with Alberta Agriculture, said three areas are especially hardhit: a large portion of southeastern Alberta, the St. Paul area northeast of Edmonton and the central Peace River region.

"There's very little moisture in their soils right now down to a metre depth," said Dzikowski. "They face a pretty risky situation in terms of getting a crop off this year. The risk is related to the fact that they have to depend entirely on timely and adequate precipitation both in spring and summer.

"Crops in these areas will not be able to withstand a dry spell of any significant length such as two or three weeks. Those who have some moisture reserves can hold out for three to five weeks."

Dzikowski is also concerned about water levels in dugouts. Some of them were almost dry by mid-April, although that is normally the time of the highest water levels because of the spring runoff. In many areas, dugouts are the only source of water for livestock.

Dzikowski said that even heavy spring rains wouldn't help the dugouts much because almost all of the water would go directly into the dry soils.

"It would just keep going straight down."

Many farmers situated within a reasonable distance from lakes or watercourses are taking advantage of the dugout pumping program run by Alberta Agriculture. The department rents out pumps and many kilometres of pipe, if necessary, to help farmers re-fill their dugouts.

In the same way, Alberta Environment provides emergency pumping aid to communities with low water reservoir levels. By mid-April, seven communities in northern Alberta and one in southern Alberta had requested aid under the Emergency Water Supply Program. In normal years, only about three or four communities make such requests. The program provides pumps and pipe on a cost-recovery basis.

The low moisture levels also affect Alberta's forests. By mid-April, the dry weather had quadrupled the number of forest fires compared with the same period last year.

"We have the potential for a very bad year because of the drought in the southern two-thirds of the province," said Gordon Bisgrove, manager of Wildfire and Aviation Operations for the Forest Protection Branch, Alberta Forest Service. By mid-April, 54 fires were burning, compared with only 13 at the same time the previous year.

Bisgrove said that if the dry weather continues, Alberta could have more and possibly larger fires than in 1981, the worst year for fires in the province's recorded history. In that year, 1,522 fires destroyed 1.3 million hectares.

Forests from Edson to Whitecourt, and in the Slave Lake and Lac la Biche areas are of greatest concern, Bisgrove said.

John Benson, director of the Forest Protection Branch, said a principal concern is finding fires which started last fall and continued smouldering through the winter in peat beneath the snow.

The good news, says Dzikowski, is that the weather systems which have caused abnormally dry conditions may be changing. the warm, dry weather has been caused by the splitting of western systems before they reach Alberta. The systems with their accompanying precipitation have been deflected northward to the Arctic and southward into the United States.

Dzikowski believes that El Nino, a quirky Pacific Ocean current which periodically warms the chilly waters off the coast of Peru and Chile, may be responsible for the change in Alberta's weather patterns. If this is the case, the patterns may soon return to normal because "El Nino has finally started to dissipate," says Dzikowski.

LETTERS

Honorable Ken Kowalski
Minister of Environment

Dear Ken,

Coordinating Committee has gone on record once again in support of *Enviornment Views.* We especially feel this latest edition with its emphasis on the Conversation Strategy has been extremely valuable, and we hope there will be some extra copies of it around for people to make use of when the public is at last asked to make input into the development of the strategy. This is excellent background material for people to have available.

Please pass along our congratulations to everyone connected with the publication; and you, too, deserve a real pat on the back for your role in helping to keep *Environment Views* in publication.

Sincerely,
Jean Sloan, Chairman
Coordinating Committee
Public Advisory Committees
to the Environment Council
of Alberta

Eric A. Bailey

The Water Literacy Project

Water is the perfect medium for teaching environmental responsibility

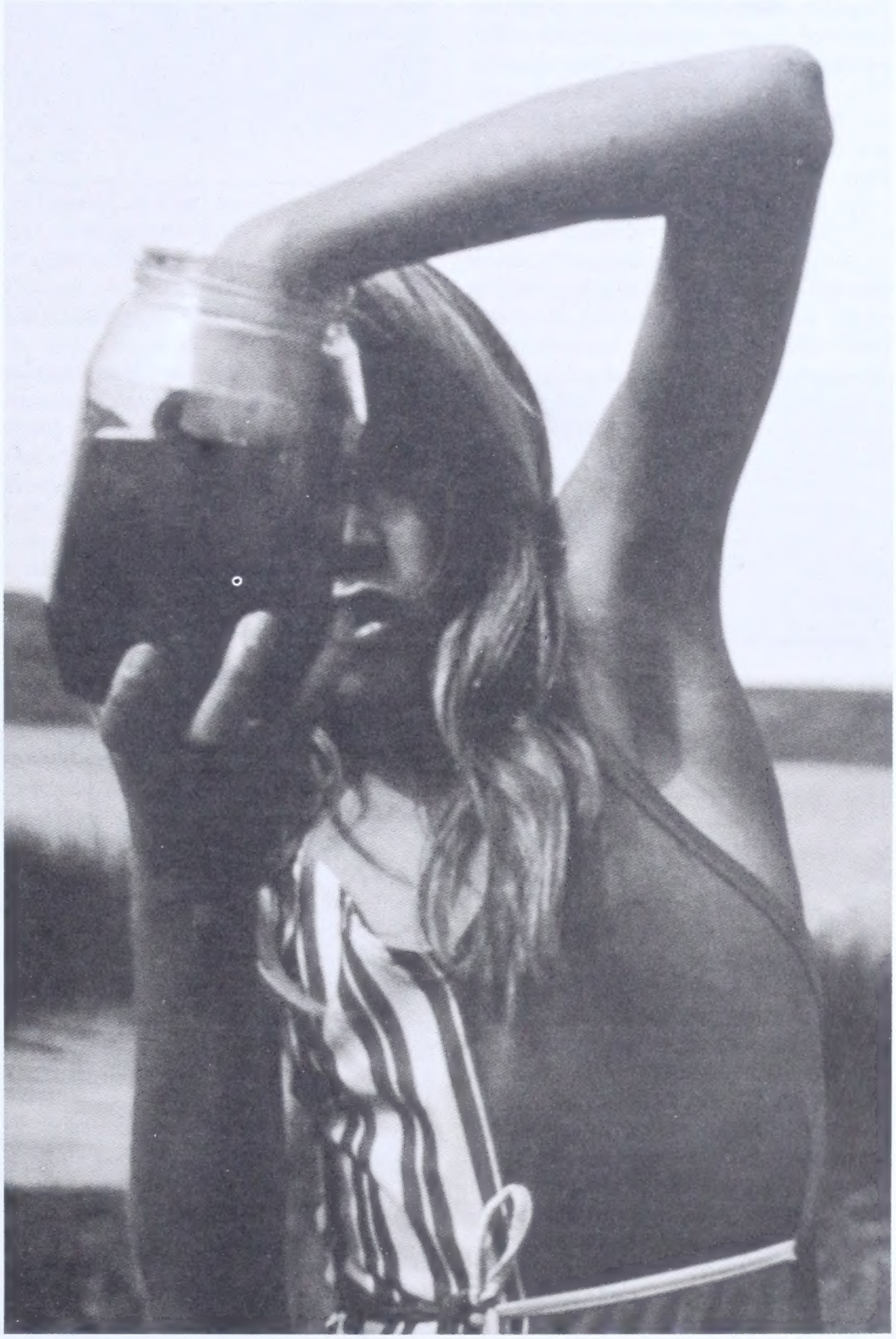
Three-year-old Robin stands at the toilet and flushes for the fifth time in a row. She watches the water rise, then fall, vanishing in a swirling rush before slowly regaining its level. As she reaches for the handle again, she wonders where it's all going.

Fewer and fewer Albertans can answer Robin's question. Can you? Do you know where your household water comes from? A well, a dugout, a river or lake? Where, precisely, is the intake for that water? Where is your sewage disposed of — could you take me to the spot? Do you know if your water supply is treated, chlorinated, fluoridated? Is your sewage treated before gushing back into the environment?

If you can answer these questions, it's likely you're water literate. The opposite, water illiteracy, is part of an overall decline in understanding how our environment works, our effect on it and its on us. At the same time general knowledge shrinks, scientific knowledge of these interactions grows. We know less at a time when there's ever more to know.

Yet, like Robin, most of us want to know where it's all going. She is what Dan Stoker, program co-ordinator at the Society, Environment and Energy Development Studies Foundation (SEEDS) in Edmonton would call a Darwin, "a great observer". But Stoker fears that without good information and direction about environmental issues, young Darwins will progress through our educational system without becoming water literate.

Stoker is in charge of putting together a Water Literacy program for Alberta Environment to be marketed directly to Alberta schools. He hopes it will teach children what they need to know in order to understand and make decisions about the management of water resources. SEEDS was contracted by the department to prepare teaching materials for elementary and junior high that teachers would include in their class work.



GOVERNMENT OF ALBERTA

Stoker says water was the perfect subject to try this with. "Water attracts kids physically, to swim and play, but kids are also attracted by its uniqueness, by its difference from the terrestrial environment. If there's water close by, it's a fabulous opportunity for outdoor studies — not just to go there but to bring some back in a bottle or fill a kid's plastic pool with water teeming with life — a billion organisms, 10,000 of which you can see if you really try." Stoker's dedication to the subject is breathless.

Learning about water doesn't have to be restricted to science class, a factor which broadens the project's appeal. Water-related topics can be covered in math, social studies, health — even in language arts. "You have kids write about what they see — you don't have to know the processes and concepts, you just have to observe them."

Set in motion by funds and some basic guidelines from Alberta Environment, Stoker and a team of 19 classroom teachers and two writers worked through 1986 to rough out the basic teaching materials. Pilot testing and revision continued until this spring. The package now contains eight units which take about six weeks each to teach — three for grades 4 to 6: a general introduction to water in Alberta, how water and land interact, and the ways people use water; and five designed for junior high school: water and agriculture, water supply, acid rain questions, water quality and water ecology.

> *Some of the most fundamental things we learn about environment we learn before we get to school.*

Students and teachers reacted enthusiastically to the program. Gary Rappaport, a Grade 9 science teacher at St. Helena Junior High School in Calgary, says the water quality unit he tried with his classes was nearly as popular as sex education. He said that might have been because water, like sex, is something his students could see a personal connection with.

"Up until we got the kit, we had been doing things like how heat and temperature affect melting point and boiling point," said Rappaport. "Water got a much better response. It got away from the normal routine and it wasn't just physical science — it was close to home. The kids were also a little surprised at the things they were learning, like what's in the water they drink."

GOVERNMENT OF ALBERTA

Principal Water Literacy project authors Mary and Gene Krupa with Dan Stoker (right) at the planning stage.

He said the students' interest level went up and, with it, their marks.

A typical Water Literacy Unit contains a resource binder, teacher's guide, student books, activity sheets and posters. Some units have slide sets and may contain laboratory support materials. Such extensive and easy to use resource materials are crucial to the program's success.

"Most teachers get no training in this at university and often if you don't know the name of something you feel you can't teach it," says Stoker.

Rappaport felt SEEDS overcame these obstacles well. "This is the first time I've ever done anything like this but they sent everything I needed." He had the chance to review the materials for the unit first, meet Stoker and discuss how it could be taught and then discussed the results of the pilot at evaluation sessions afterward.

David Gue, a science teacher at Crescent Heights High School in Medicine Hat who also helped test the Water Quality unit of the program said, "I really like the approach Alberta Environment took using local examples and working with teachers at the local level.

New Age Science

Such programs as the Water Literacy project which take an integrated approach to science may be easier to fit into the new high school science curriculum which will be introduced in 1990, simply because the underlying ideals are so similar.

Bernie Galbraith, Alberta Education's program manager for junior high science says, "The present science curriculum doesn't meet the scientific literacy needs of students, particularly those going into areas where they have no need for advanced science. We have students going into sales, business, or arts, for example, and what are we giving them: biology, chemistry or physics. We say, 'Take at least one (course) and learn some special concepts such as formulae, calculations and nomenclature,' which, in many instances, they'll never use again.

"In the new science program, we have tried to pick the skills and knowledge that will have the most relevance to students and which will have lasting value to them. We also try to emphasize ties between what they learn and the environment around them."

The new junior high school program will combine all sciences in all grades with an emphasis on current issues in science, especially related to human health and the environment. In senior high, a new science course will be introduced at the advanced level, called Science 10, 20 and 30, which Galbraith

"They tailored the unit to Alberta. If it had been a Canada-wide project, it might not have talked about irrigation, for example." Gue says this is a common fault of traditional textbooks. "Nobody's producing a textbook just for Alberta. They need to satisfy the British Columbia and Ontario market too."

What Gue wants from such pre-packaged teaching materials as the Water Literacy project are "ideas on what to do, where to do it, and how to get organized.

"For water pollution, we looked at testing water from wells, ponds, lakes, near industrial plants and from municipal water supplies and then sat down and imagined we were going to write to our MLA or Alberta Environment and tell them what we thought about the quality of our water. We did the traditional scientific work but we took that extra step to making decisions about things that are real and happening around us right now. This is pretty high-level thinking for these kids."

Facilities and equipment present technical difficulties for anyone trying to prepare a packaged program like Water Literacy. You can't assume all schools will have the equipment to project films, film strips or slide sets of the type you intend to supply or that they will have the equipment to make laboratory experiments. For this reason, Alberta Environment and SEEDS determined that Water Literacy would be a paper-based program, not requiring special gear. Stoker says the topic itself helped limit some of these problems.

"Gerbils and snakes need care but the 20,000 organisms in a bottle of pond water don't," he says.

Jim Martin

GOVERNMENT OF ALBERTA

Jim Martin, Alberta Environment's environmental education co-ordinator, has taken the project from concept through to the stage where it will be ready for limited release this fall. A former teacher himself, Martin acknowledges that some teachers may be skeptical of educational materials about water management developed by the government department responsible for managing water resources, especially when that has been a controversial role.

"If people had said this project was just a lot of public relations for Alberta Environment, then it wouldn't have worked. That's why we decided to approach SEEDS to prepare the project," he said.

Martin says the program has run into other snags. "We were writing the series for an old curriculum even as a new curriculum was being developed. We could have stopped but we were encouraged by teachers and Alberta Education to continue."

Even though Martin is waiting for Alberta Education to finalize curriculum changes (see sidebar on the new general science program to be introduced to junior and senior high schools in 1990) to see how the series will fit, he's confident they'll be able to work the material in.

Alberta Education's reaction to the Water Literacy project has been guarded but warm.

"Some material was proposed for Water Literacy that didn't meet our needs and we rejected it," said Bernie Galbraith, program manager for Junior High Science at Alberta Education. "But, we were grateful for Alberta Environment's attention and we admire and appreciate their initiative."

Teachers and the schools shouldn't have to carry the load alone. Stoker says we can all reach environmental literacy. "I hope every parent can say they're a teacher because some of the most fundamental things we learn about environment we learn before we get to school."

Martin at Alberta Environment says the people at Alberta Education have taken to calling him an environmental evangelist because he preaches repeatedly to them that "we must prepare students to understand their relationship to the environment and to make responsible decisions about maintaining an environment that's fit to live in. If we wait for people to grow up before they start to learn this, we're in a lot of trouble."

Says Education's Galbraith: "Science education in Alberta has to change to better meet the needs of people going into the next century.

"Most people now in many respects are just barely coping with the world around us, leaving too much to others to provide, take care of, fix, and decide about. We can't simply prepare people to opt out of the world, we have to prepare them to live in it and take a role in steering it."

Water literacy, energy literacy, science literacy — life literacy — sounds like this is where it's all going, doesn't it, Robin?

Eric Bailey is a freelance writer specializing in outdoor and interpretive writing, working from Alder Flats.

says will concentrate on turning students into "good citizens rather than scientists." Biology 30, Chemistry 30 and Physics 30 will remain along with a less rigorous science program which will not lead to an advanced certificate.

Many high school teachers will have to prepare to teach more courses and some schools will have to perform timetabling acrobatics. Teachers used to presenting science in the traditional disciplines may not adapt easily to new teaching philosophies and budgetary restraints may make it unlikely that extensive in-service training, information sharing, networking and communication programs to ease the transition will take place.

There's also a concern that students themselves could defeat the program. Even though the course has been designed to be as rigorous as the other senior high school science programs, if students equate "general" science with "Mickey Mouse" science, they will shun it.

Galbraith insists the general science program "is not watered down science but a rigorous program challenging students to see applications of science to the world around them."

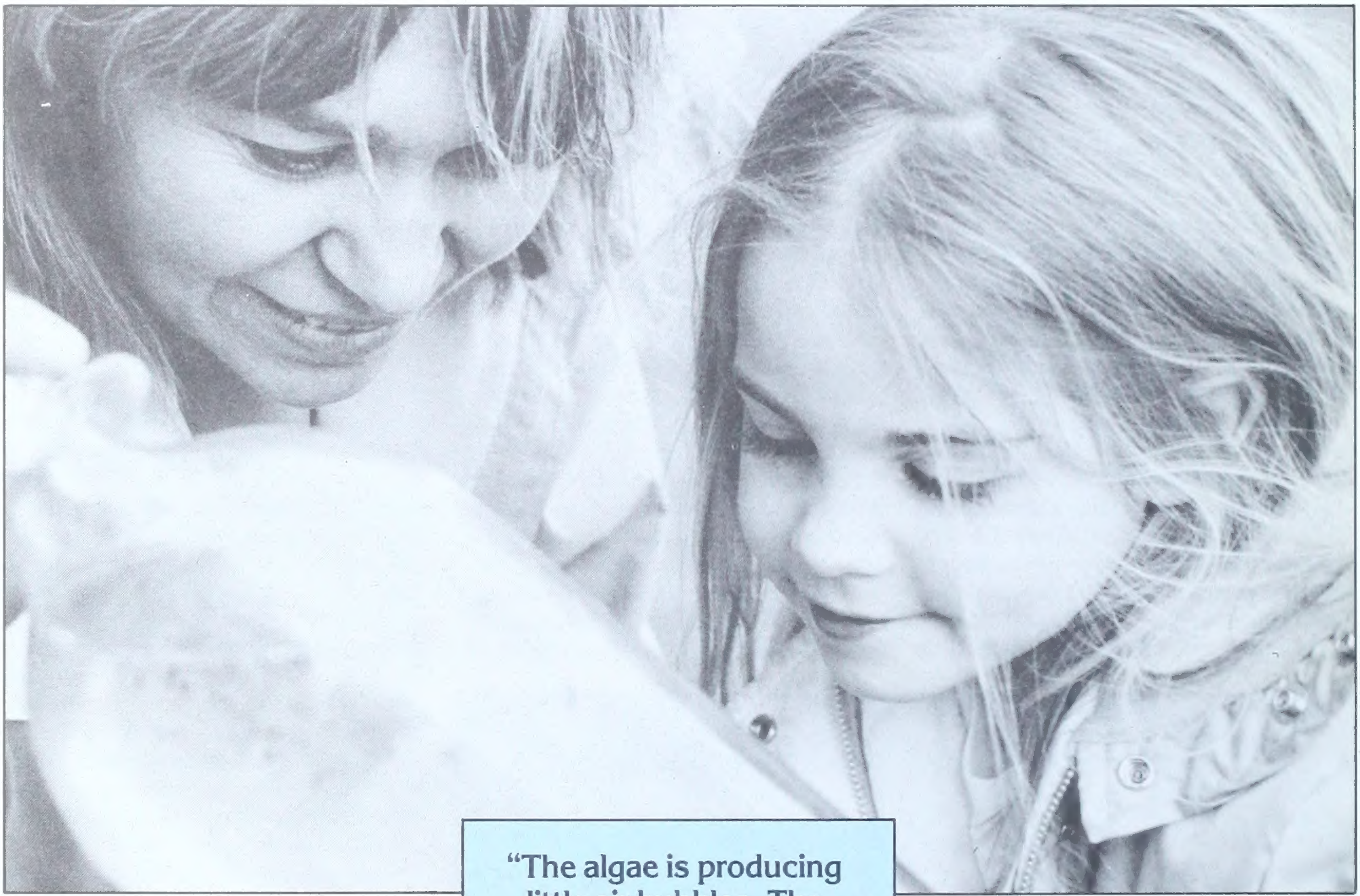
Whether post-secondary institutions, students and teachers agree will be the new curriculum's acid test.

— Eric Bailey

Gail Helgason

A WORLD OF LEARNING in a Pop Bottle

"A wonderful tool" for classroom education about the aquatic environment.


GOVERNMENT OF ALBERTA

"The algae is producing little air bubbles. The guppy seems to be getting along well. I have found 1 dead waterboat man, 1 dead mayflower myphmp, 1 dead side swimmer. The water has a strong odor."

Student observation of a pop bottle lake, December, 1987

The shrieks and shouts rang out from the Grade 7 science classroom at Charlie Killam Junior High School in Camrose.

Had someone played a prank on the teacher? Brought a garter snake into the classroom? Or told the world's scariest ghost story?

Not at all. The cause of all the disruption was a lowly worm.

Not just any worm, of course. *This* worm was inside in a clear plastic bottle, filled to within five centimetres of the top with pond water. The creature was in the process of being gobbled up by another bottle-dweller, a guppy.

"There was a lot of excitement about that," recalls Bob Wall of Camrose, one of four teachers who recently tried the "pop bottle lake" experiment in three Alberta junior high schools.

The pop bottle experiment is included in the water ecology unit of a new environmental education program for Alberta schools, called the Water Literacy project. The curriculum is being developed for Alberta Environment by the Society, Environment & Energy Development Studies Foundation (SEEDS), a non-profit educational group.

Dan Stoker, program director at SEEDS, calls the experiment simple, inexpensive and easy to maintain. Most importantly, it offers teachers "a wonderful tool" for classroom education about the aquatic environment.

All that's required is a clear plastic two- or three-litre pop bottle with the label removed, and water from a slough, a warm, shallow lake or a slow-moving river where lots of aquatic plants are present.

Students also add a small amount of bottom sediment, and some plant life, especially algae. A kitchen sieve is recommended to catch aquatic life, such as snails, sideswimmers, damselflies and tiny water fleas.

The pop bottle should be placed in a location, preferably in the classroom, where it receives sunshine but doesn't become too hot. Students observe what happens in the bottle, and record their observations in a notebook each month for the three months of the experiment.

"In essence, the pop bottle is a beautiful analogy to the whole world," says Stoker, who suggested the experiment several years ago to a young friend who wanted an idea for a science fair project.

The idea was not original with Stoker, though. As he tells the story, 15 years ago, as the newly appointed educational resources co-ordinator for Environment Ontario, he inherited just such a bottle from his predecessor.

Stoker's Alberta friend won first prize at the fair —and Stoker saw the possibilities for applying the same concept to the classroom.

"By placing such a bottle in front of kids, some marvellous questions spring up," he says. "Some of them are the same questions asked by early scientists, such as: 'Where is the oxygen coming from?' and 'How do the organisms survive?'"

The world, Stoker explains, is made up of ecological systems or *ecosystems*, which consist of groups of organisms together with their non-living or physical environment. The important point to understand about an ecosystem — the one which is brought home by the "mini-ecosystem" in the pop bottle — is that all its member depend on each other.

The experiment illustrates, for example, the crucial importance of plant life to animal life. The plants in the pop bottle provide oxygen for the other organisms through the process of photosynthesis. This results in a self-sustaining environment, in which there is a one-way flow of energy way flow of energy from the sun — a fundamental concept on which the whole life cycle of the world depends.

Freshwater crustaceans such as water fleas, seed shrimp and sideswimmers often do well in a closed ecosystem such as the pop bottle, usually outliving major predators such as guppies. If students put too much organic material into their pop bottle — as they often do — the supply of oxygen is soon decreased and the larger organisms die. This results in more bacteria, making the water murky.

In a couple of weeks, the water becomes clear and the environment stable. Algae and thousands of microscopic organisms have thrived although larger life forms disappeared.

"When the fish dies, students will typically react as if it were a catastrophe," says Stoker. "But eventually they realize that the nutrients are recycled. They might see thousands of extra water fleas as a result."

Wall says the pop bottle is an excellent way of showing how all natural environments go through more or less predictable changes.

"One of the lessons is succession," he says, noting that when some of the guppies in the classroom died for lack of oxygen, bacteria began to thrive. The increase in bacteria cleared up the dead material at the bottom of the "lake", recycling the nutrients.

Debbie Wojtkiw, a Grade 7 science teacher at Legal School in Legal, is another who recently tested the pop bottle experiment. She's enthusiastic about its applications in the classroom.

"My students really liked the experiment, and they learned a lot of vocabulary — words like carnivores, herbivores, trophic levels ...

"They also learned about food webs and the food chain, and the tolerance and intolerance of organisms to living in poor conditions."

She believes that aquatic education is extremely important in the classroom: "With activities such as this, we hope students will learn to protect the environment. When I'm 80 years old, I'd like to still be able to drink the water."

Wall calls the water ecology unit "excellent" and says he is particularly pleased that it deals with Alberta situations.

Students appear equally enthusiastic.

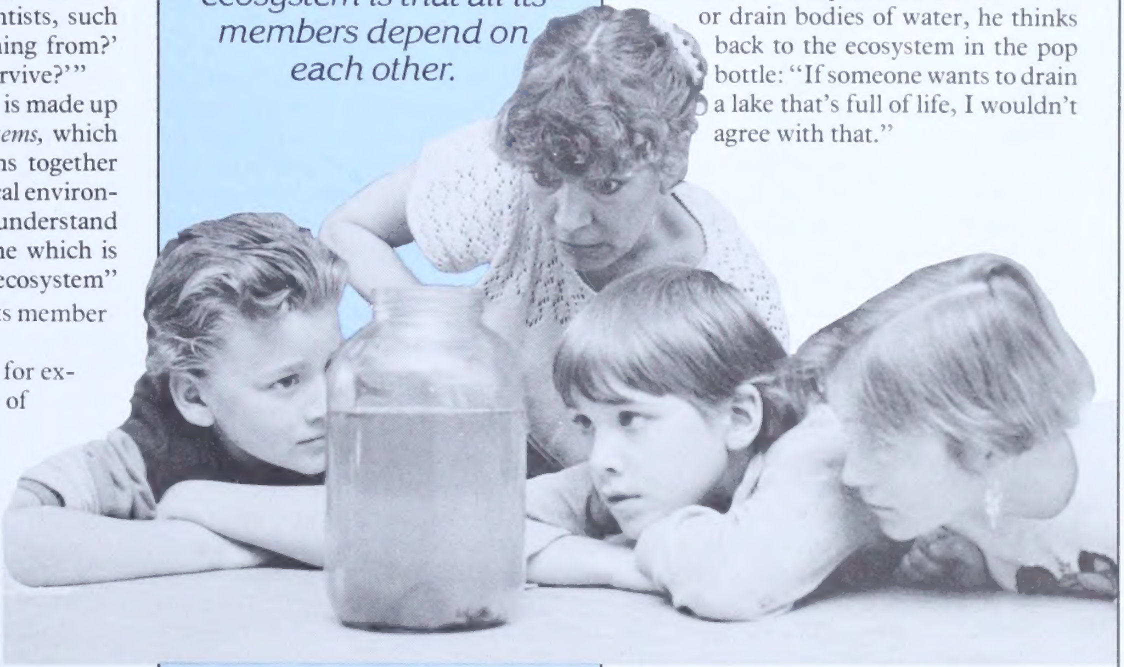
"Before, when I looked at a lake, I thought that what I saw was all that was there," says Philip Burneau of Camrose, a 13-year-old student in Wall's Grade 7 class. "Now I know there's a lot more to it."

He was fascinated by the small signs of life which emerged in his pop bottle after a few days — "these little hydras and little jelly blobs — they were weird."

Along with most students interviewed, he found that the hands-on experiment made learning about scientific principles far more vivid than just relying on a text: "When you see something like that, you really get the feel of it."

Bruneau says that when he now hears about plans to alter lake levels or drain bodies of water, he thinks back to the ecosystem in the pop bottle: "If someone wants to drain a lake that's full of life, I wouldn't agree with that."

The important point to understand about an ecosystem is that all its members depend on each other.



Linda Hart's Grade 3 class at Ormsby Elementary School in Edmonton. Writer Gail Helgason and friend Jill study a snail's progress (opposite).

GOVERNMENT OF ALBERTA

Shandy McLean, 12, also of Camrose, says the pop bottle experiment was "really fun."

"We learned a lot of things from it. I was surprised at how long the fish lived. I expected it would die quite quickly, but it lived for three weeks."

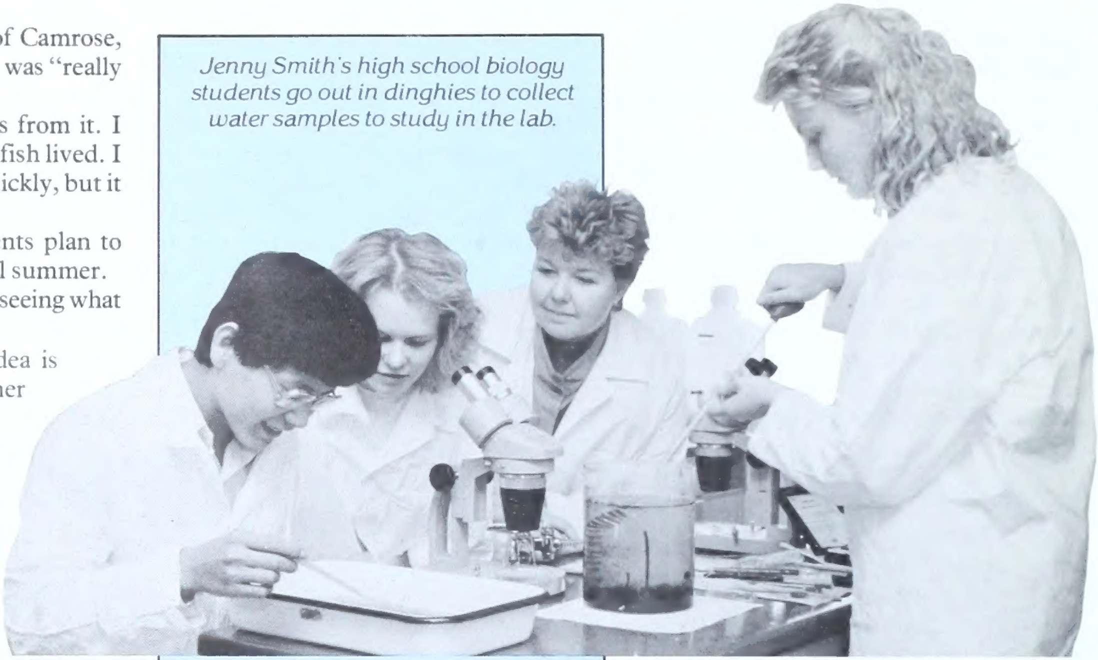
She and many other students plan to keep their bottles, at least until summer.

"I'm still looking forward to seeing what other changes will occur."

Although the pop bottle idea is new to Alberta classrooms, other imaginative ways have been used for years to bring environmental education alive for students.

Grade 11 biology students at the Camille J. Larouge Collegiate in Red Deer, for example, test the health of the Red Deer River twice a year. The students work in groups of twos or threes to draw samples of small invertebrates from the water.

Rough counts are done on the spot; samples are then taken back to the classroom where they are preserved in ethyl alcohol and further observed over a two-week period.



Jenny Smith's high school biology students go out in dinghies to collect water samples to study in the lab.

GOVERNMENT OF ALBERTA

Hands-on experiment made learning about scientific principles far more vivid than just relying on a text.

According to their teacher, students can make a number of simple tests to determine the ecological soundness of an aquatic environment.

"It's a known fact that the presence of stonefly nymphs and mayflies is an indication of clear water," explains Rene Van Hyfte. "Then, if you have leeches and

Dan Stoker talks to kids

Seeing is Believing

Ever since he first encountered the mini-ecosystem of a lake in a bottle, Dan Stoker has been an enthusiast.

"For years, I have strived to get teachers to set up ecosystem bottles. In my role as curriculum developer and co-ordinator of the Water Literacy Project, the opportunity arose to share the adventure of discovery that can take place in a bottle filled with lake or slough water and a host of freshwater life.

"Early this year, students in Calgary, Camrose and Legal built and monitored 'pop bottle lakes' (alias — ecosystem bottles). It was part of the newly developed unit entitled "Ecology Studies of Lakes in Alberta". I couldn't resist the opportunity to chat with them once the unit was over. I had to find out what they thought and what, if anything, they had learned.

"What follows are some of the insights and points of view expressed by Grade 7 and 8 students who willingly shared their experiences with 'pop bottle lakes'."

On Awareness:

Eddie and Philip: "We have learned there are more things in a lake than meets the eye. We thought a lake was just water, fish and weeds, but in this unit we found out that there were many different bugs and microscopic organisms. When we next look at a lake we will see more."

On Change:

Bobbi and Lisa: "In our pop bottle lake, there have been many changes. For example, we have noticed many different aquatic animals. There have been many different colors of worms. Some snails have grown over a period of time. The odor has also changed. It used to smell bad but now it smells clear."

On Lake Ecology:

Joeline and Leslie: "Our fish lived for three months. We have observed our bottles and they have blocks of algae and a faint lake smell. We have looked at different aquatic animals and have realized what they need to survive. We now know how important lake ecology is to animals and us."

On Guppy Death and the Whole Experience:

Lisa: "Our little animals started to multiply after the fish died. At one point the water was just swarming. There are living things still in there and you don't want to hurt or damage them so I guess we could pour them back into a lake when we're through.

"It was a change compared to what we normally get to do and everyone liked that. You get to go and examine your bottle and after you're done you feel like you really accomplished something. You know something."

On Keeping the Bottles:

Giles: "It would be interesting just to see what would happen in a year to see if it would clear or not. You could also put some oil on the water because lakes get a lot of oil from boats ... just to see what would happen."

On Microscopic Life:

Rene: "We went to the lab and got to put some (pop bottle water) under the microscope. We saw little 'bugs' and parameciums. We used an eye dropper and took it little worms called chironimads ... that's an indication of dirty water."

Students also look at the "diversity index" of the river.

The presence of numerous species, such as brown trout, brook trout and Dolly Varden, is a sign of a healthy aquatic environment. On the other hand, "if a lake has perch but no pike, that indicates that the water is getting dirty."

The program, called the Aquatic Invertebrate Monitoring Program, began in Edmonton in 1973 and has since been used in several Alberta locations.

Says Van Hyfte: "It opens up the students' eyes. They can see for themselves how the environment is going."

"Pond study" field trips are an important part of Grade 10 and 11 biology in teacher Jenny Smith's classes at Victoria Composite High School in Edmonton. Students go out in dinghies on area ponds to obtain water samples, test the soil for acidity, and identify the different kinds of vegetation which grow within 10 metres of the shoreline.

"We really believe that you can't study biology unless you go out into nature," says Smith.

She also takes her students to Elk Island National Park for nature trips. Students are asked to observe everything from fire scars or tufts of animal fur on trees to bush cocoons.

Sui-Fan Wong, an 18-year-old Grade 12 student who has participated in the Elk Island expeditions, says the trips are both enjoyable and useful.

"It just made me more aware of my surroundings. In my opinion, hands-on practical application is especially important when you are studying wildlife."

Even at the primary level, ponds provide a rich educational tool, says Linda Hart, a teacher at Ormsby Elementary School in Edmonton. She likes to take her Grade 3 class on field trips to "a gorgeous swamp" on the west edge of the city.

"We eat dandelion salads and we talk about how you can't do that sort of thing in the city, where pesticides are used."

She says the trip to the swamp — which is scheduled to be drained for a housing project — has had a profound effect on some of her youngsters.

"It just had never occurred to them that we are displacing a lot of animals when we build something new. They would say things like: 'Oh, those poor animals, where are they going to go?'"

As a language arts and social studies teacher, Hart also incorporates environmental education into her teaching whenever she can. She recently based a whole language arts program on the beaver, studying stories and poems about Canada's national symbol.

Hart often takes her students to a picnic shelter two blocks from the school to look for signs of spring, collect leaves or even to read or write poetry.

"Everybody always laughs when I say I'm going to the bush to write poetry. But it really makes a tremendous difference."

She hopes the respect and love which students develop for the environment at an early age will stay with them throughout life. And she has seen a lot of promising signs.

She recalls one small boy who caught 10 frogs on a field trip.

"The next time I was going out to the swamp, he came up to me and asked: 'Can you take these frogs back with you when you go and set them free?'

"It was really touching."

Gail Helgason, a partner in Helgason & Dodd Communication Services Ltd., is an Edmonton freelance writer and editor, and co-author of several outdoor guidebooks to Alberta.

DAN STOKER

(the water) from the side of the bottle. It was pretty neat. In the bottle there must be millions (of living things)."

On the Unusual:
Chris: "The most unusual thing that I experienced during this unit was the way that the pop bottle lakes turned black, and then they cleared up again. This intrigued me because it seemed to be almost supernatural. It was interesting to watch the changes that the bottle made."

On the Experiment and the Guppy's Demise:
Shannon and Chris: "We have a theory why our bottles are darker than the other class's bottles. Maybe because there was more light shining on their side (of the school) so that it would make their bottles a different temperature and give them more sunshine. The algae would make more oxygen.

"It was sort of sad when the fish died. It had been sort of cute. We named it and it was kind of neat. At first I thought, well it's over. But then there were still the 'shrimpies'. So it was sad but it was also neat because you could see things happen after the fish dies and you started to look for other things (organisms). The fish blocked out everything else ... only when the fish died did we start to see everything else."

Intriguing Discoveries:
Alaina: "The most unusual thing was the sideswimmer. I have never seen anything like it. They are like flies, but sideswimmers don't have wings. Sideswimmers swim by moving their legs back and forth. They are so unique in their own special way."

Paul: "The most awesome thing was a bug that looked like a log. I liked watching it as it climbed a stem or a wall (in the bottle). I never saw the whole body. I think it was the most unique bug in the whole bottle."

Something Different:
Joanne: "I fell it was a good break from rocks and stuff. I liked to observe it whenever I could. I enjoy looking at the changes. We got to observe some of the things that we had never seen before. I am really interested in the pollution of lakes. I think it is a real shame what people do to our lakes."

A Revelation:
Lynn: "Although it was fun studying lake ecology, I don't think I will ever go swimming in a lake again."

Dan Stoker is the co-ordinator of the Water Literacy project.

Kristin Goff

Take It To The Ponds

Learning about water outside the classroom

GOVERNMENT OF ALBERTA

Pond dipping is a popular activity in many Alberta parks.

Six-year-old Michael's keen eyes spot a tiny water strider skating over the lake surface in the shade of the dock. With one swift dip of his plastic cup, he's made the catch. His excitement couldn't be greater if he'd landed a prize-winning lake trout.

Brother Jeffrey is fascinated with green goopy stuff that's floating on the pond. Mum says it is a kind of algae called jellyballs. Meanwhile dad is stalking an elusive frog in a marshy area up the beach a bit.

Without thinking too much about it, most of us already play out scenes like these every summer. We may not call our dabbling an exercise in education. But experts say the kind of investigation or poking around we do as individuals or with our families can be more meaningful in conveying information about the water environment than many structured programs.

"The fun part is to look and to see all the things that are there, that you didn't know were there .... It doesn't matter if we have their names or not. There are people or books to tell us that. It's the act of discovery that is the most important," says Gail Heinze-Milne, co-ordinator of the Helen Schuler Coulee Centre in Lethbridge, which sponsors a wide variety of water education programs.

Leisurely canoe trips around the lake in the evening will teach in the most natural way about habitats. Hikes along rivers, lakes and ponds can become discovery trails of interesting plant, bird and animal life. With a little ingenuity the patient individual can even engage in fish watching.

"It's a great family activity. I really enjoy taking kids out. Kids have a knack for seeing tiny things," says Wayne Roberts, a veteran fish watcher who is also collection manager for the University of Alberta Museum of Zoology.

Happily, we don't need to choose between the structured program or the unplanned approach to environmental education. We can have both and increase our knowledge and pleasure together. Aside from water literacy programs offered through schools, a wide variety of field trips, guided walks, pond study programs and environmental films and lectures are offered at parks and nature centres around the province.

Other opportunities for involvement are available from groups like 4-H, whose summer conservation camp includes an excellent water conservation program, or Trout Unlimited Canada which uses hundreds of volunteers each summer to build improvements into Alberta rivers or protect stream banks.

But picking up a few professional tips can help adults and kids get more out of the activities they like to do on their own.

For instance, having a pond kit can enhance an afternoon of river or pond dabbling. Many provincial parks already have such kits which visitors can check out for the day, but they are also simple to make.

Include a small net of the type sold in pet stores for aquariums; a clean container or ice cream bucket to dump the net's contents into; a foam egg carton or number of clear plastic pill bottles to study individual water plants and animals. A magnifying glass is useful and, if desired, a larger insect type net (made from nylon, wire hoop and broom handle) is nice for dipping out further from the shore.

The Alberta Recreation and Parks pond kits available at some provincial parks include an identification and instruction booklet specially written for the purpose. But do-it-yourselfers can do well with a copy of "Pond Life, A Golden Nature Guide" by George K. Reid (Golden Press, N.Y.) which is available in paperback for about $6.

Kids have a knack for seeing tiny things.

Experts suggest a number of fun pond dipping activities. Very young children might simply look at their catches and name or imitate the movements of one or two favorites. Older kids or adults may organize plants and water animals in egg carton compartments in the order of a food chain.

Dusk and dawn are the best times of the day to see activity around and in ponds, lakes and rivers. Late May and June is also a good time because of the variety of activity going on, although fall is also a good time to see migrating waterfowl.

Dusk and dawn are the best times of the day to see activity around and in ponds, lakes and rivers. Late May and June are also good times of the year because of the variety of activity going on, although fall is also a good time to see migrating waterfowl.

Another fun tool to have around is a waterscope to serve as a window to the underwater world. One can be made simply by cutting the top off a milk carton and covering it tightly with plastic wrap.

That may come in handy in some fish watching. Roberts, who occasionally lectures to nature groups on fishwatching, says little has been written on how to go about it (he hopes to remedy this soon.) For the novice here are a few suggestions:

Watch the spoonhead sculpin. During late April to early June, the male guards eggs glued by the female to the underside of rocks. He'll chase away insects and small fish and carefully fan the eggs during the two to three weeks they take to hatch. The sculpin, a small fish which is less than 12 centimetres long with a big head, can be found hiding under rocks in clean waters with rocky bottoms. Once you have located a sculpin nest, go back in the evening when he is most active.

The mountain whitefish is another good fish to observe because they are tolerant of people, and active while feeding. It is possible to wade out in a river and have mountain whitefish feeding all around you. They can be found in streams and shallow portions of lakes throughout Alberta.

One of the more spectacular events for Alberta fish watchers is the spawning of various sucker species, says Roberts. In late April, May and a bit into June spawning takes place in the tributaries of lakes or large rivers where water is shallow and the bottom is clean and gravelly. After a couple of weeks it is fun to go back and see the area teeming with newly hatched fries.

Or you could try shining a light into the water at night. Many fish, accustomed to feeding at dawn and dusk, will swim to the edge of the dimly illuminated area to feed.

A book useful for identifying fish is "The Fishes of Alberta" by Martin J. Paetz and Joseph S. Nelson (available from Alberta Forestry, Lands and Wildlife information centres. Include a cheque for $4 to the provincial treasurer.)

GOVERNMENT OF ALBERTA

A Girl Guide group collecting samples at Fish Creek Provincial Park in Calgary.

Alberta is filled with wonderful waterlands to investigate and many of its parks and nature centres offer educational programs along a broad scope. The following is intended to offer some ideas of what's available around the province but is by no means a complete list.

Northern Alberta

Any park which has access to a lake, river or pond will work for self-directed water studies. Hilliard's Bay on Lesser Slave Lake has self-guided pond study kits and lots of places to observe waterlife. Lesser Slave Lake Provincial Park, on the same lake, is also recommended. It had interpretive programs at the beach last year and may do so again, although final plans were still under discussion. Carson Pegasus, north of Whitecourt, and Sir Winston Churchill park on Lac La Biche are also "best bets" for studying acquatic life. Check at Sir Winston Churchill for interpretive programs like minnow dipping. Carson Pegasus should have pond kits for visitors to borrow.

Edmonton Area

John Janzen Nature Centre offers a wide variety of programs, including films and lectures, and sometimes has field trips to ponds for kids or whole families. The centre's Sunday family workshops also sometimes touch on water topics.

Wagner Natural Area is an unusual area with a number of spring-fed ponds, some of which are sulphur springs, others which have calcium dissolved in them and produce a pasty grey material which is to be seen everywhere. There is a self-guided trail with booklet. Plant life includes orchids, thick, dramatic covers of moss and even three species of carnivorous plants. John Janzen can provide some information since Wagner doesn't have an office.

Clifford E. Lee Nature Sanctuary has no organized programs but is a good spot for bird watching and viewing water animals. There are three self-guided trails to take. Visitors will find pamphlets for the trails at the registration sign. Devonian Botanic Garden can provide further information.

Elk Island National Park, 35 kilometres east of Edmonton, has films and slide shows at its interpretive centre. Guided walks and evening interpretive programs are also offered, most frequently during summer months. Visitors can check for those which cover water-related topics. A self-guided floating boardwalk looks at how the hills and prairie potholes of the area were formed and the life in and around Astotin Lake. The Lakeview trail (with wheelchair access) shows how land changes over time from open water to wetlands and eventually to aspen and spruce forests.

GOVERNMENT OF ALBERTA

Insect identification at Elkwater Lake in The Cypress Hills.

A "Living Waters" boardgame based on a walk around Astotin Lake is available at the interpretive centre just for the asking.

Central Alberta

Miquelon Lake Provincial Park offers a number of water-oriented programs. They have the self-guided pond study kits. Guided tours along the lakeshore, through beaver country or a bike hike comparing lake, pond and marsh environments have been offered. Check for current programs. Hundreds of gulls nest on islands in Miquelon Lake. In fall migrating waterfowl, including swans, can be seen.

Vermilion Provincial Park, on the Vermilion River, is another recommended

Ribbet! Ribbet! Ribbet! Ribbet!

Hatching frog or toad eggs at home can be an exciting project. It's one that's sure to inspire wonder as tiny eggs hatch into tadpoles then transform to hopping land creatures, usually within a matter of weeks.

But success requires care and protection of the life that's been nurtured. The frog or toad should be returned to its habitat, preferably in the same area from which it was taken, says Sue Fast, chief naturalist at the John Janzen Nature Centre. Otherwise you'll kill the animals and risk upsetting the natural balance of the pond where the eggs were found. Here are Fast's tips on hatching frog or toad eggs:

1. When you find a mass of eggs (generally from late April to June depending on species and weather) select only a few to bring home, not the entire mass. Eggs need oxygen because they are living. Like too many fish in a tank, they'll die if too crowded.

2. Bring eggs home in the original pond water. Bring home lots and lots of extra water from the pond for use later. Never use tap water since it contains chlorine that kills eggs. Place the eggs in the original pond water in a small tank at home. Keep the tank out of sunlight since too much heat will kill eggs.

3. Every two days replace half the water in the tank with unused pond water which has been stockpiled for this purpose. If they are kept cool and the water is kept fresh some of the eggs will hatch.

4. Once the eggs hatch continue to keep water clean, replacing part of it every few days. You may put in a small amount of lettuce for tadpoles to eat but usually they get enough food from algae on the sides of the tank. Put rocks on the bottom or perhaps a small underwater plant to help promote oxygen supply. Big plants tend to rot and rob oxygen, so avoid them.

5. Once the tadpoles start to grow, take out all but a few and release them. About 10 is all a small tank should support. Put rocks or brick on the bottom for frogs and toads to climb on once they develop legs.

6. As soon as they've developed legs and crawled on to the "land" it's best to release them back to their native area immediately so they can feed themselves. Or as Fast puts it, lovingly, "As soon as you've raised them up, you have to sort of kiss them goodbye and let them go."

spot. It carries the pond study kit and has a variety of interpretive programs in summer.

Calgary Area

Fish Creek Provincial Park has guided walks on Sundays and a variety of field trip offerings, some of which are water-oriented. Summer interpretive programs may include some water topics. A self-guided walk follows along a trail over Fish Creek. A booklet explaining points of interest and a tape-recorded narrative with cultural and historical information can be used on the trail.

The Inglewood Bird Sanctuary is a good place to observe water birds along with other aquatic life. Park officials do not encourage pond dipping here.

Banff National Park, 130 kilometres west of Calgary, has two self-guided walks near the Cave and Basin Centennial Centre. A short Marsh Trail looks at an unusual warm marsh environment and even features tropical fish which were placed in the marsh in the 1960s and survived. A Discovery Trail, above the Cave and Basin Centennial Centre, examines the hot springs. Summer guided hikes are available at a number of lakes. Check the park Mountain Guide and posters for information on films, interpretive programs and guided hikes.

Southern Alberta

The Helen Schuler Coulee Centre in Lethbridge offers a wide variety of programs. Guided family hikes are offered each Sunday. Special hikes, field trips, lectures and exhibits are offered on various topics year round. Day camps for children 6 to 14 offer river and pond studies. The Coulee Centre is adjacent to the Elizabeth Hall Wetlands and the Alexander Wilderness Park. Together they form a 300-acre natural area.

Dinosaur Provincial Park offers a look at water's role as an agent of change. The self-guided Badlands trail, with brochure, explains how the erosive action of water created the badlands. The Cottonwood Flats Trail, along the Red Deer River, explains how cottonwood trees and other plants have adapted to the environment.

Writing-On-Stone Provincial Park on the Milk River also offers a look at how a constantly changing flood plain shapes the land. An interesting guided tour, offered at times when conditions are right, is a wade across the river.

Kristin Goff is a freelance writer living in Edmonton.

Sharon Adams

WHY LEARN About Water?

Everyone knows how important water is, don't they?

DUCKS UNLIMITED

Crucial wetland habitat is protected and expanded by the dedication of such groups as Ducks Unlimited.

Alberta Environment is launching an ambitious new program aimed at teaching school children about water. Parks and nature centres throughout the province provide interpretive programs about acquatic environments. Newspapers and magazines are full of discussion about water quality and water management.

Is all this necessary? Everybody knows how important water is, don't they?

Yes and no. Gary Sykes, president of the Alberta branch of the Canadian Water Resources Association laments: "Even after a decade of media coverage, of activity by lobby groups, there's not much appreciation of water as an ecosystem.

"We look at water as a free commodity, not as something to be shared with birds, fish and other animals."

Sykes served his water resources apprenticeship by helping to develop the massive, two-and-a-half-year, $300,000 Canada West Foundation overview of water resources in Western Canada. He believes it's important to educate everyone in society about the delicate thread that binds the diversity of aquatic ecosystems to their value as a resource to man, good management to maintaining diversity.

That way, everyone — in their personal lives, at work, in supporting lobby groups or causes, in making political choices — can make better decisions about good water management.

"We can manage our water resources

GOVERNMENT OF ALBERTA

Dr. Bill MacKay

much better than we have," says Dr. Bill MacKay, a professor and limnologist at the University of Alberta's zoology department. "The problem we face in Alberta is that we don't have a lot of water. We have a certain obligation to manage well what we do have, but we've been using single-use criteria."

Single-use management has meant regulating rivers' flow, capturing abundant spring runoff to use in summer drought or stockpiling it to ensure a steady flow for hydro generation or irrigation. But this ignores how nature has adjusted over millennia to the annual flood cycle, says McKay.

Good management entails understanding the effect of flow regulation on the ecosystem.

Alberta's rivers peak twice annually as snow melts first in the lowlands and then in the mountains. This causes floods which rework the sand and gravel in river bottoms and gravel bars, scour out vegetation, erode the banks, and raise and lower the water's temperature.

"But when we regulate, there is no erosion, no reworking of the sediments, gravel bars get clogged, fish spawning (dependent on water temperature) is disrupted, aquatic weeds increase."

When water is released from the reservoir, it is sucked from the colder bottom layers, lowering water temperature downstream. This affects both the spring spawners — trout, pike, walleye — and their food supply — mayflies and nymphs.

"Healthy ecosystems are diverse ecosystems," McKay says. But when sloughs are drained to benefit farmers, lakeshores denuded of weeds to suit cottagers, lake levels lowered for municipal water supply, or dams built to regulate rivers' water flow — the result is a lessening in diversity.

This, in turn, can create an unhealthy ecosystem — one which has lost its natural controls. If one species, algae, for example, no longer kept in check by natural predators, has a population boom, this creates another problem, and can result in further ecosystem manipulation and further lessening of diversity.

"Multiple use is the way to look at it," says Gary Stewart, senior provincial biologist with Ducks Unlimited, which will spend about $8 million this year developing 15,000 acres of wetland habitat in the province. This is "still not enough to turn things around" for waterfowl which lose nest sites every year to predation, flood and man's intervention. Mallards and pintails are particularly threatened.

"What we try to get across is that we're not just interested in birds." Wetlands play an important role in the prairies' water cycle, a role Stewart equates to a coral reef, teeming with life.

"Most people ignore the functions wetlands are performing," he says. During spring wetlands keep run-off floods from tearing across the land; agricultural chemicals, for which cattails and bullrushes "have an insatiable appetite", would otherwise pollute the water; and groundwater is cleansed and recharged during the steady and slow percolation down from wetlands.

GOVERNMENT OF ALBERTA

Ducks Unlimited has to win the support of farmers, who aren't usually keen about birds feeding on their crops. Sometimes it's just a matter of explaining how the combination of drought and intensive farming are threatening the waterfowl. Other times, it's a matter of understanding that wetlands will bring flood control, better hay crops or cattle forage.

Sykes believes it's time everyone in the province realizes there's a tradeoff, and that each individual has a stake in ensuring the health of water systems.

He gives the example of farmers who wanted to improve on inefficient irrigation canals. They scraped weeds off the bottoms, lined the canals, killed the narrow band of vegetation lining the banks without knowing they would eliminate the protective vegetation cover for wildlife and eradicate waterfowl and fish habitat.

"Education is important," agrees Patricia Mitchell, a biologist with Alberta Environment's pollution control division, "because as people learn about their environment, they'll want to protect it."

But, she says, "People haven't made the complete leap that their individual actions can affect the environment — that wasting water or dumping paint thinner down the sink contributes to the problem. They're willing to speak out against certain things happening, but not willing to look at what they can do. It's one thing to criticize government, another to take the final step to 'what can I do myself?'"

Sykes agrees with Mitchell about the need for individuals to understand the effect their decisions can have on a delicate ecosystem. But "In a lot of cases it means giving up something ourselves. We're not used to giving up stuff. We're pretty pampered."

Mitchell says that's why research is key to education. "In my own career, the more I learn, the more I understand, the better decisions I can make. That's true for every individual, farmers, business owners, ordinary people." Research makes clear the link between practice and effect, and education makes that information broadly available through society so individuals can decide their own course of action, or lobby to change that of others.

"What is the effect of municipal sewage and effluent on rivers? Does clearing land have an impact on lakes? Research is needed to prove the link," she says.

> *"Education is important because as people learn about their environment, they'll want to protect it."*

Research provides answers needed for good management of the water resources. "When we fully understand the effect of an action, we can develop good regulations. If we know the effect of putting a pulp mill on one river, it will help us to be able to predict the effect of another mill on a different river. We can say, 'no, it can't go in;' or 'yes, it can go in with these limitations.' The result is setting standards for that industry or user."

But John McCulloch, a habitat biologist with Trout Unlimited, would also like to see the public more involved in developing those standards.

"Farmers and industry seem to have more control over the water resources and nature and the environment come in second or third," he says. "A lot gets by the public because they're not aware of how water is being used or abused."

One result has been a decline in fish numbers which Trout Unlimited has been trying to reverse since 1985 by improving stream habitat.

The organization is trying "to promote a sense of stewardship" by developing volunteer projects for habitat rehabilitation on about 200 streams south of Edson.

DUCKS UNLIMITED

For its projects, Ducks Unlimited needs the support of farmers with enough knowledge to value wetlands.

The major conflict is between trout habitat and cattle, which break down stream banks and widen the channels. The streams become shallower, warmer and have lower oxygen content — unfit habitat for fish spawning, egg development, and feeding.

A first step is persuading ranchers to agree to shoreline fences. Some need simply to be told how to rebuild fish populations and a slide show of 'before and after' shots of projects wins over others.

Transportation corridors are another problem. Engineers control flooding to prevent road washouts by 'channelizing' streams — digging and reinforcing deep, narrow, artificial streambeds unsuitable for fish habitat.

But "by spending a little more money to add ledges and V-shaped pools, they could achieve the same result but without sacrificing trout habitat."

Trout Unlimited demonstrated this in Allison Creek in the Crowsnest Pass, which was 'channelized' in 1968 during construction of Highway 3 to Fernie, B.C.

There, volunteers have built log weirs, pools and rock shelves and planted willows along the bank to enhance spawning and feeding areas. "Within six weeks, fish were just piled into the section we had done."

Aside from targeting streams needing rehabilitation and providing volunteer project plans to encourage that the necessary work is done, it is also Trout Unlimited's role to "proactively get people to listen to us, to see that stream enhancement projects are good. And to start taking the streams into consideration" when designing transportation corridors or running cattle operations.

Although trade unions are more accustomed to thinking about industrial development in terms of the jobs that it provides, the Alberta Federation of Labour has recently condemned a meatpacking plant planned for High River which would create 480 local jobs.

AFL president Dave Werlin says workers are becoming more knowledgeable about the environment and want "a stewardship role". The federation is concerned that the High River plant may dump treated effluent into the Bow River, a world-class trout fishery and the source of drinking water for thousands of people.

"We have to be careful we don't weigh jobs against the environment. We should be eliminating all effluents from our rivers, not adding to them. We have only one environment. To trade the environment for jobs is short-sighted", says Werlin.

The U of A's MacKay also says ordinary Albertans need to be educated about their responsibility. "When man encounters something not neat, his first response is to clean it up. Often that reduces habitat." When cabin owners clear fallen trees from a lake or weeds from lakeshore, they should be aware they are sacrificing habitat for fish and birds.

Sharon Adams is a Calgary freelance writer.

AROUND THE PROVINCE

Big Lake wetlands a big draw

Big Lake just north of Edmonton could become a big draw for bird watchers and a must-see marsh for visitors looking for the unspoiled west.

Although the lake is adjacent to both Edmonton and the City of St. Albert, it has remained unspoiled because of development restrictions and shallow, marshy conditions not favorable for boating or development near the shoreline.

"It's a sleeping giant," said Wes Shennan, senior planner for the Edmonton Metropolitan Regional Planning Commission. "How many major cities have large marshes which are important for waterfowl, areas that are basically still in their natural state?"

The commission is studying the best way to use the lake. A public meeting in March rejected by a large margin the idea of maintaining the status quo. The planners are now looking at how much development to allow on and near the lake.

One option is to allow some sensitive development to enhance the waterfowl habitat of the lake.

Big Lake is one of 20 lakes designated under the Wetlands for Tomorrow program in which Alberta Fish and Wildlife and the private Ducks Unlimited work to improve habitat.

Terry Kosinski, a habitat biologist with the Alberta Wildlife Division, said the Wetlands program would like to install dikes to trap water in some near-shore areas, construct nesting islands, re-route high-elevation power lines which claim many birds each year and improve fish-spawn in the lake.

Shennan says many residents of the area want development to go even further, keeping in mind the environmental sensitivity of the area. They'd like to see nature trails, a nature interpretation centre, an oil and gas interpretation centre at an abandoned wellsite back from the lake and even some country residential areas about three kilometres from the lake.

Shennan believes the final report will probably come down somewhere between these two options for development. He hopes to have the final draft report ready for discussion at more meetings before the end of the year, although he acknowledges that the approval process can be difficult.

"When you have four municipal governments involved (Edmonton, St. Albert, the Municipal District of Sturgeon and the County of Parkland), it's got to be a long process."

VIEWPOINT by Norm Elliott and David McCo

Canadians feel a special stewardship for their environment and are virtually unanimous in their desire to protect it. Every government, every political party, virtually every industry, the entire news media and every shade of Canadian public opinion finds common cause in a single issue. The threat to our environment holds greater potential for disaster than any other. Obviously, the need for educating society to the danger is urgent, and as in the past when faced with major social problems, it makes sense to turn to the schools.

When mechanization took over the chores in our then largely agricultural society, the schools were required to take from the available instructional hours enough time to provide for physical education. The well-rounded person was thought to need at least a modicum of knowledge about music and the arts. Exit another piece of the instructional day and week.

Shop training became a desirable part of the school experience, as did drama. Today, our health has become an increasingly important and time demanding part of the school responsibility. The carnage on our highways made driver education all but compulsory. Sputnik frightened us sufficiently to replace the old texts which provided a smattering of science and physics for everyone with new chemistry and physics courses which tended to discourage all but the most determined.

The very existence of lakes, forests and wildlife is threatened by human ignorance and indifference; and pollution threatens our oceans and the air we breathe. No human problem can have higher priority than the need for a population that can first understand, then intelligently express its concern for environmental protection.

To illustrate just one small part of the challenge: An intelligent response to a life threatening question posed by the emission of any of the 65,000 commercial compounds which enter our air each year requires at least a basic understanding of the effects of pesticides, herbicides, dioxins and the gases which threaten to change the world's climate and acidify its land.

Education is an essential part of the solution.

But are we realistic? Can we really expect the schools to add yet another public concern to their curricula? In the days when schools were organized to concentrate exclusively on the three Rs, Canadian society has funded the commonly available school experience for about 12 years. The average academic attainment has increased in response to the minimum requirements for most occupations: from Grade 8, to 10, 12 and, increasingly today for at least some post-secondary training. Realistically we can't continue to extend the time most of us spend in schools.

Our alternatives, therefore, are basically two. We can drop some components of the existing program, substituting a program on the environment. But the existing programs are meeting real needs, so it would be hard to reach a concensus about which ones could be cut. Our second alternative is to incorporate environmental education into the existing curriculum. There are some obvious starting points. We already teach basic sciences — biology, chemistry, physics and math. Let's teach our kids that the same chemical reaction that yields nitric acid to supply fertilizer for a hungry world, (or bombs for a warring world) produces acid rain from industrial nitrogen oxide emissions.

We can begin by encouraging more teachers to become environmentalists. That should be the easy part — so many of them are already. And, the sciences don't offer the only fertile teaching ground. Poetry and literature are frequently inspired by an appreciation for nature. Kilmer's Trees; Wordsworth's Daffodils and Blake who saw the world in a grain of sand and the heavens in a wild flower all spring to mind. Music too from Vivaldi through Joni Mitchell ("Pave Paradise, Put Up a Parking Lot"), can contribute an emotional response to confirm the reasoned response to environmental issues.

The traditional curriculum committee — provincial Department of Education — Teacher's College process could take more than 35 years to make these changes, and we can't afford to wait that long. But there's a better way. An intensive and ongoing in-service training program for practising teachers with a simultaneous and compulsory preparatory class in teacher education would offer a better, quicker response.

There is no revolutionary way to change the school system overnight but experience confirms that evolution is safer and surer. A program to raise and sustain concern for Canada's environment among teachers is within our power right now.

Norman Elliott, of the Canadian Petroleum Association and David McCoy of Canterra Energy Ltd. are members of the Environment Views *editorial board.*

BOOK REVIEW by David Spalding

Parks in Alberta.

Joy and Cam Finlay. Hurtig Publishers. 1987. 243p. Soft cover, $17.95.

When the first crows wing over the melting snowdrifts, many Albertans plan to make the most of Alberta's brief but wonderful summer outdoors. This new guide to Alberta's parks makes trip planning easier, and provides a valuable companion in the field.

Alberta has one of the finest park systems in Canada, with more area in national parks than any other province, a large and diverse provincial park system, and a growing network of urban and regional parks, wilderness areas and natural areas. Even the most well-travelled naturalists are unlikely to have explored the system thoroughly; and this guide is most useful and timely.

Its pages are packed with fascinating information. Where would you find a park named by Mormon settlers after a mountain in Israel? (Taber Provincial Park). How about the site of a major Indian battle? (Lethbridge Urban Park). Which is perhaps the finest dinosaur site in the world? (Dinosaur Provincial Park). Where could you find a mineralized beaver dam? (Big Hill Springs). Which park has an ongoing archaeological dig? (Strathcona Science Park). Which has special accommodation for the handicapped? (Kananaskis). These and many other intriguing facts pique the imagination.

The Finlays are well qualified to compile this handbook. Both have been involved with nature in Alberta for many years; among other achievements Joy is known to teachers across North America as an inspiring environmental educator, while Cam was a pioneer park naturalist in Elk Island, and later manager of the John Janzen Nature Centre in Edmonton. Both played an important role in compiling the earlier more comprehensive but less detailed **Nature Guide to Alberta,** and both are much involved in the Wildlife '87 movement celebrating a century of nature conservation in Canada. Edmontonians in particular know them as the successors to Bob Lister in writing a weekly *Edmonton Journal* column on nature.

Parks in Alberta makes an attractive book, a little too large for the pocket, but fine for the car or knapsack. A couple of dozen attractive color photos highlight the beauties of the parks, and maps of regions and some individual parks are useful. More than 70 parks are included; mostly provincial, but some national and municipal. Inclusion of the new urban parks will be welcomed by city dwellers, but the important Wood Buffalo will be missed by lovers of the boreal forest. Wilderness and natural areas are not included.

Brief introductory sections refer to major resource publications, and discuss safety and ethics. The parks are presented within the main ecological regions, each with a short general introduction. The individual parks are introduced with a brief section in which activities, camping, information, access and size are summarized. The main text for each is a narrative introduction, followed by history, natural history, and sometimes a section on special areas within the park. Regrettably, there is no index.

The text is a chatty compilation of diverse data; sometimes listing, sometimes presenting illuminating fragments of history and natural history. Some small errors — even in park, species and personal names — may confuse, but the ready availability of this mass of data will more than offset the minor weaknesses.

Browsing its pages should encourage all Albertans to visit a park they have not seen, or explore in greater depth one that is familiar to them.

If undelivered, return to:

Environment Views
Alberta Environment
9820 - 106 Street
Edmonton, Alberta T5K 2J6

ENVIRONMENT UPDATE

Environment Week '88 Highlights

Edmonton, May 29
City of Edmonton and the Edmonton Natural History Club are sponsoring "Picnic in the Park" in Rundle Park with the theme "Our Common Future". Games, displays, nature activities, ceremony.

Edmonton, May 29-June 5
The John Janzen Nature Centre and Grant MacEwan Theatre Players present dramatic presentation at various venues in Edmonton.

Drayton Valley, May 29-June 5
The Pembina Institute for Appropriate Development is sponsoring various recycling events throughout the community.

Calgary, May 29-June 5
The Clean Calgary Committee is promoting "An Environmental Affair", the annual Clean Calgary program.

Peace River, May 29-June 5
Alberta Environment will be hosting displays, speakers, video presentations and school visits.

Grande Prairie, May 29-June 5
Alberta Environment will be hosting displays, speakers, video presentations and school visits.

Edmonton, June 3, 4
The City of Edmonton and Toxic Watch are sponsoring *The Great Paint Swap* and *Toxic Round-up* at the Prince of Wales Armory.

Calgary, June 3-4
The Alberta Wilderness Association will be holding a joint opening of the Wilderness West Shop and open house at the Wilderness Resource Centre.

Lethbridge, June 4
The South Country Community Association is holding Naturefest, a street/park festival. Music, speakers, films, displays, art/photo contests, and adopt-a-tree program.

Calgary, June 5
Shannon Terrace Environmental Education Centre at Fish Creek Provincial Park is holding an Earth Day. Displays, nature activities, crafts, ceremony.

Red Deer, June 5
The Kerry Wood Nature Centre is sponsoring an Earth Day. Nature walks, displays, crafts.

Hastings Lake, June 5
(County of Strathcona) Environment Day at Hastings Lake Hall. Exhibits, displays, nature activities, crafts, ceremony.

For more information on Environment Week '88 activities contact **Peggie Graham,** *Edmonton* 495-2525.
Jennifer Thomas, *Edmonton* 427-6230
Kerry Lowe, *Calgary* 297-5937
Mike Chirobokow, *Lethbridge* 329-8234
Harvey Smith, *Red Deer,* 342-1063
Ian Waugh, *Cochrane,* 678-5508
Martin Budeley, *Canmore,* 678-5593
Martha Kostuch, *Rocky Mountain House* 845-3668
Rob McIntosh, *Drayton Valley,* 542-6017
Jim Kells, *Grande Prairie,* 538-5380
Terry Becker, *Peace River,* 624-6167

Water Conference

A major water conference, drawing on outdoor sport, recreational and environmental professionals, will be held in Calgary June 3-5.

The Canadian Association of Outdoor Councils conference is sponsored by the Calgary Area Outdoor Council and is to "educate people in the safe and responsible use of our outdoor sport and recreation water resources," said Jamie Parkin, conference co-ordinator.

Parkin said some 250 to 300 people from across Canada are expected at the conference which includes six elective sessions offering a total of more than 20 topics from which participants may choose.

Keynote addresses will look at recreational management of water as a changing resource and the benefits of river safety education and leadership in water recreation programs, both past and future.

Don Starkell, author of "Paddle to the Amazon," will talk about his canoe trip from Winnipeg to the mouth of the Amazon at the June 4 banquet.

In addition to conference sessions, an exhibitor display with about 30 booths from commercial recreation outfitters and government bodies was scheduled as part of opening activities during the evening, Friday June 3.

Although conference registration was officially to close May 1, late registration is possible by contacting COAC's Calgary office 270-2262. Proceedings of the conference should be published within two or three months.

If you have a short news item of province-wide interest you'd like to contribute to Environment Update, please send it to the editor at the address on the Contents page. The editor reserves the right to select and edit the items.